

Chemistry

Chemistry majors and minors must earn a minimum grade of C- in all chemistry courses.

LOWER DIVISION

CHEM 100. From Stars to Rocks: Being a Scientist in the 21st Century (3). Introduction to the impact of astronomy, chemistry, physics, and geology on student life and society, practical aspects of the study of the disciplines and associated careers from different perspectives. [E-LD.]

CHEM 107. Fundamentals of Chemistry (4). Terminal course. Fundamental concepts and applications of general and inorganic chemistry. [Letter grade only. Weekly: 3 hrs lect, 3 hrs lab. Prereq: math placement category I, II, or III. B-LD.]

CHEM 109. General Chemistry I (5). Fundamental concepts: chemical foundations, stoichiometry, chemical reactions, gases, thermochemistry, atomic theory, bonding, liquids, solutions. For students in science, engineering, and related majors. [Letter grade only. Prereq: math placement category I or II or category III and MATH 101i (C). Weekly: 3 hrs lect, 3 hrs lab, 1 hr disc. B-LD.]

CHEM 110. General Chemistry II (5). Fundamental concepts: kinetics; equilibrium; acids and bases; acid-base, solubility, and complex ion equilibria; entropy and free energy; electrochemistry; qualitative analysis. For students in science, engineering, and related majors. [Letter grade only. Prereq: CHEM 109 with a grade of C- or higher. Weekly: 3 hrs lect, 6 hrs lab.]

CHEM 128. Introduction to Organic Chemistry (3). An introductory course in organic chemistry for natural resource majors. Topics will include structure and bonding, nomenclature, and common functional groups and their reactivity. [Prereq: CHEM 107. Weekly: 2 hrs lect, 3 hrs lab.]

CHEM 198. Supplemental Instruction (1). Collaborative work for students enrolled in chemistry. [CR/NC. Rep.]

CHEM 228. Brief Organic Chemistry (4). For majors in biological science/natural resource areas. Nomenclature, physical properties, synthesis, and reactions of compounds representing major functional group categories. Reaction mechanisms emphasized. [Letter grade only. Prereq: CHEM 107 with a grade of C- or higher or CHEM 110 with a grade of C- or higher. Weekly: 3 hrs lect, 3 hrs lab.]

UPPER DIVISION

CHEM 308. Alchemy (3). Inquiry into materials, methods, and processes of alchemy from perspectives of alchemist, contemporary chemistry. [B-UD.]

CHEM 310. Inorganic Chemistry I (3). Advanced concepts: nuclear properties, molecular symmetry, bonding, metallic and ionic solids, acids and bases, oxidation-reduction, non-aqueous media,

chemistry and organometallic compounds of the representative elements. [Letter grade only. Prereq: CHEM 110 with a grade of C- or higher.]

CHEM 323. Nuclear Magnetic Resonance Spectroscopy (NMR) Techniques (1). Operate NMR spectrometer; prepare samples. Individual projects. [Prereq: CHEM 324; CHEM 324L. Coreq: CHEM 325; CHEM 325L. CR/NC.]

CHEM 324. Organic Chemistry I (3). First semester of a one-year sequence. Chemical bonding, chemical structure, spectroscopy, physical properties, stereochemistry, reaction mechanisms, and synthesis. [Prereq: CHEM 110 with a grade of C- or higher. Coreq: CHEM 324L.]

CHEM 324L. Organic Chemistry I Laboratory (2). First semester of a year-long sequence. Laboratory techniques, library skills, and synthesis. [Prereq: CHEM 110 with a grade of C- or higher. Coreq: CHEM 324. Weekly: 6 hrs lab.]

CHEM 325. Organic Chemistry II (3). Second semester of a one-year sequence. Chemical bonding, chemical structure, spectroscopy, physical properties, stereochemistry, reaction mechanisms, and synthesis. [Prereq: CHEM 324 and 324L, with C- or higher. Coreq: CHEM 323 and CHEM 325L.]

CHEM 325L. Organic Chemistry II Laboratory (2). Second semester of a year-long sequence. Laboratory techniques, spectroscopy, library skills, unknown analysis, and synthesis. [Prereq: CHEM 324, CHEM 324L both with C- or higher. Coreq: CHEM 325. Weekly: 6 hrs lab.]


CHEM 330. Molecular Modeling (3). Apply molecular modeling and computational chemistry methods [semiempirical, ab initio, and density functional] to problems in organic and inorganic chemistry, biochemistry, and molecular biology. [Prereq: CHEM 228 or CHEM 325 (C); CHEM 325L (C). Weekly: 2 hrs lect, 3 hrs lab.]

CHEM 341. Quantitative Analysis (5). Principles and methods of classical chemical analysis. Introduction to instrumental methods. For chemistry majors and others who require a rigorous treatment of solution equilibria and training in precise quantitative lab techniques. [Prereq: CHEM 110 with a grade of C- or higher. Weekly: 3 hrs lect, 6 hrs lab.]

CHEM 361. Physical Chemistry I (3). Application of quantitative mathematical methods to fundamental chemical systems: equilibrium thermodynamics and chemical kinetics. [Prereq: CHEM 341(C); PHYX 107 or PHYX 211(C); MATH 210 or MATH 215; all with grades of C- or higher. Weekly: 2 hrs lect, 2 hrs activ.]

CHEM 362. Physical Chemistry II (3). Application of quantitative mathematical methods to fundamental chemical systems: quantum theory, spectroscopy, and statistical thermodynamics. [Prereq: CHEM 324; CHEM 324L; CHEM 361 all with a grade of C- or higher. Weekly: 2 hrs lect, 2 hrs activ.]

CHEM 363. Physical Chemistry II Lab (2). Experimental application of quantitative mathematical methods to fundamental chemical systems: laboratory investigations in equilibrium thermodynamics, chemical kinetics, quantum theory, spectroscopy, and statistical thermodynamics. [Prereq: CHEM 341 with a grade of C- or higher and CHEM 362 (C). Weekly: 6 hrs lab.]

 **CHEM 370. Earth System Chemistry** (3). Chemistry of the earth, including elemental cycling and speciation in the environment, the impact of man on biogeochemical processes, and the effects of climate change on the chemical/physical interactions occurring within and between the atmosphere, hydrosphere, and biosphere. [Prereq: CHEM 107 or CHEM 110 with a grade of C- or higher.]

CHEM 399. Supplemental Work in Chemistry (1-3). Directed study for transfer student whose prior coursework is not equivalent to corresponding courses at HSU. [Prereq: Department approval required. Rep.]

CHEM 410. Inorganic Chemistry II (3). Advanced concepts: chemistry and organometallic compounds of the transition metals, the lanthanoids, and the actinoids; reaction mechanisms; catalysis; solid state chemistry. [Prereq: CHEM 310. Offered alternate years.]

CHEM 410L. Inorganic Chemistry II Lab (2). Advanced laboratory and instrumentation techniques: synthesis, characterization, and reactions of inorganic and organometallic compounds. [Prereq: CHEM 310 with a grade of C- or higher and CHEM 410 (C). Weekly: 6 hrs lab. Offered alternate years.]



CHEM 434. Biochemistry I (3). First semester lecture of a one-year sequence. Biochemical energetics, introductory metabolism, nature and mechanism of action of enzymes. [Prereq: CHEM 110; any calculus course; CHEM 228 or (CHEM 325 and CHEM 325L) all with a C- or higher.]

CHEM 434L. Biochemistry I Laboratory (2). First semester of a one-year sequence. Laboratory techniques. Must be taken concurrently with CHEM 434. [Prereq: CHEM 228 or (CHEM 325 and CHEM 325L). Coreq: CHEM 434. Weekly 6 hrs lab.]

CHEM 435. Biochemistry II (3). The second semester lecture of a one-year sequence. Biochemical energetics, introductory metabolism, nature and mechanism of action of enzymes. [Prereq: CHEM 434 and CHEM 434L with a C- or better. Coreq: CHEM 435L.]

CHEM 435L. Biochemistry II Laboratory (2). Second semester of a one-year lab sequence. Biochemical energetics, introductory metabolism, nature and mechanism of action of enzymes. [Prereq: CHEM 434 and CHEM 434L with a C- or better. Coreq: CHEM 435. Weekly: 6 hrs lab.]

CHEM 438. Introductory Biochemistry (4). Brief course in biochemistry. The chemistry of amino

 sustainability-focused;  sustainability-related; *activ* activity; (C) may be taken concurrently; *coreq* corequisite(s); CR/NC mandatory credit/no credit; *disc* discussion; † Course requires one or more prerequisites. DCG Diversity & Common Ground; *d* domestic; *n* non-domestic LD Lower Division; UD Upper Division; A B C D E General Education (GE) Areas;

acids, proteins, nucleic acids, lipids and carbohydrates. Includes enzyme kinetics, bioenergetics, structure and function of biological membranes, discussion of common laboratory methods. [Prereq: CHEM 228 or (CHEM 325 and CHEM 325L) with a grade of C- or higher. Weekly: 3 hrs lect, 1 hr disc.]

CHEM 441. Instrumental Analysis (4). Principles and methods. For chemistry majors and others requiring training in instrumental techniques of analysis. [Prereq: CHEM 341. Weekly: 2 hrs lect, 6 hrs lab.]

CHEM 480. Selected Topics in Advanced Chemistry (1-4). [Prereq: IA. Rep.]

CHEM 485. Seminar in Chemistry (1). Seminar presentations on current chemistry topics by majors with senior standing in chemistry. Capstone course. All chemistry majors are encouraged to attend. [Prereq: senior standing. Rep.]

CHEM 495. Undergraduate Research (1-3). Individual investigation of selected problem. Conference, reading, research. Final written report. For students showing outstanding ability. [Prereq: IA. Rep.]

CHEM 499. Directed Study (1-4). [Prereq: IA. Rep.]

GRADUATE

CHEM 599. Independent Study (1-3). [Prereq: IA. Rep.]